Apoptosis: death by fire and killer lipids

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Physiological cell death (PCD) is the process that ensures the controlled and timely elimination of useless cells in plants and animals. PCD is an inclusive term for all forms of cell suicide, such as programmed cell death and apoptosis. PCD is also an altruistic defense reaction against viruses and was adopted as the preferred method of killing by cytotoxic T lymphocytes and natural killer cells specializing in anti-viral immunity. PCD involves two components, cell suicide and the tidy disposal of dying cells by their neighbors or professional phagocytes. The immune system faces an unpredicatable antigenic universe and cannot afford lymphocytes with useless or dangerous specificities. Lymphocytes undergo apoptosis readily and the mediator of their death is the sphingolipid ceramide. Lymphocyte membranes contain ceramide-releasing sensors (sphingomyelinases that break down sphingomyelin into ceramide and phsophorylcholine) that are activated by PCD-inducing agents. Ceramide inhibits the respiratory burst in lymphocytes as well as several anti-apoptotic devices.

Ref.: Life and death in lymphocytes: The ceramide connection. The Immunologist: 2:185-189,1994.